Date: 19 June 2001
To: Bechtel Hanford Inc. (technical representative)
From: TechLaw, Inc.
Project: 600-23 Verification Sampling - Soil
Subject: Inorganics - Data Package No. H1367-LLI (SDG No. H1367)

INTRODUCTION

This memo presents the results of data validation on Data Package No. H1367-LLI prepared by Lionville Laboratory Inc. (LLI). A list of samples validated along with the analyses reported and the method of analysis is provided in the following table.

Sample ID	Sample Date	Media	Validation	Analysis
B12400	5/24/01	Soil	C	See note 1
B12401	5/24/01	Soil	C	See note 1
B12402	5/24/01	Soil	C	See note 1
B12403	5/24/01	Soil	C	See note 1
B12404	5/24/01	Soil	C	See note 1
B12405	5/24/01	Soil	C	See note 1
B12406	5/24/01	Soil	C	See note 1
B12407	5/24/01	Soil	C	See note 1
B12408	5/24/01	Soil	C	See note 1
B12409	5/24/01	Soil	C	See note 1
B12410	5/24/01	Soil	C	See note 1
B12411	5/24/01	Soil	C	See note 1
B12412	5/24/01	Soil	C	See note 1
B123V5	5/24/01	Soil	C	See note 1
B123V6	5/24/01	Soil	C	See note 1
B123V7	5/24/01	Soil	C	See note 1
B123V8	5/24/01	Soil	C	See note 1
B123V9	5/24/01	Soil	C	See note 1
B123W0	5/24/01	Soil	C	See note 1
B123W1	5/24/01	Soil	C	See note 1
B123W2	5/24/01	Soil	C	See note 1
B123W3	5/24/01	Soil	C	See note 1

1 - ICP metals by 6010A; hexavalent chromium by 7196.

Data validation was conducted in accordance with the Bechtel Hanford Incorporated (BHI) validation statement of work and the 100 Area Remedial Action Sampling and Analysis Plan (DOE/RL September 2000). Appendices 1 through 6 provide the following information as indicated below:

Appendix 1. Glossary of Data Reporting Qualifiers
Appendix 2. Summary of Data Qualification
Appendix 3. Qualified Data Summary and Annotated Laboratory Reports
Appendix 4. Laboratory Narrative and Chain-of-Custody Documentation
Appendix 5. Data Validation Supporting Documentation
Appendix 6. Additional Documentation Requested by Client

DATA QUALITY PARAMETERS

- **Holding Times**

  Analytical holding times for metals are assessed to ascertain whether the holding time requirements were met by the laboratory. The holding time requirements are as follows: Soil samples must be analyzed within 6 months for ICP metals and 30 days for chromium VI.

  All holding times were acceptable.

- **Preparation (Method) Blanks**

  Preparation Blanks

  At least one preparation blank, consisting of deionized distilled water processed through each sample preparation and analysis procedure, must be prepared and analyzed with every sample delivery group. In the case of positive blank results, samples with digestate concentrations less than five times the preparation blank value have had their associated values qualified as non-detected and flagged "U". Samples with concentrations of greater than five times the highest blank concentration do not require qualification.

  In the case of negative blank results, if the absolute value exceeds the contract required detection limit (CRDL), all nondetects are rejected and flagged "UR" and all detects that are less than ten times the absolute value of the associated preparation blank result are qualified as estimates and flagged "J". If the absolute value of the negative preparation blank is greater than the instrument detection limit (IDL) and less than or equal to the CRDL, all nondetects are qualified as estimates and flagged "UJ" and all detects less than ten times the absolute value of the blank are qualified as estimates and flagged "J". If the sample results are greater than ten times the absolute value of the preparation blank, no qualification is necessary.

All preparation blank results were acceptable.

Field Blank

No field blanks were submitted for analysis.

- **Accuracy**

Matrix Spike

Matrix spike (MS) analyses are used to assess the analytical accuracy of the reported data and the effect of the matrix on the ability to accurately quantify sample concentrations. Matrix spike recoveries must fall within the range of 70% to 130%. Samples with a spike recovery of less than 30% and a sample result below the IDL are rejected and flagged "UR". Samples with a spike recovery of 30% to 69% and a sample result less than the IDL are qualified "UJ". Samples with a spike recovery of greater than 130% or less than 70% and a sample result greater than the IDL are qualified as estimates and flagged "J". Finally, for samples with a spike recovery greater than 130% and a sample result less than the IDL, no qualification is required.

Due to a matrix spike recovery of 64.9%, all chromium VI results were qualified as estimates and flagged "J/UJ".

All other matrix spike recovery results were acceptable.

- **Precision**

Laboratory Duplicate Samples

Analytical precision is expressed by the relative percent differences (RPD) between the recoveries of matrix spike duplicate (MSD) analyses performed on a sample in the analytical batch. Precision may alternatively be assessed using unspiked duplicate analyses performed on a sample in the analytical batch. If both sample and replicate activities (concentrations) are greater than five times the CRDL and the RPD is less than 30%, no qualification is required. If either activity (concentration) is less than five times the CRDL, the RPD control limit is less than or equal to two times the CRDL. If the RPD is outside the applicable control limit, associated results are qualified as estimated detects or estimated non-detects.

All laboratory duplicate results were acceptable.

Field Duplicate

Two sets of field duplicate samples were submitted for analysis (B123W2/B123W3 and B12411/B12412). The duplicate sample results were compared using the validation guidelines for determining the RPD between a sample and its duplicate. The chromium (total) and zinc RPDs in sample duplicate pair B123W2/B123W3 were outside QC limits (46%). Under the BHI statement of work, no qualification is required. All other field duplicate results were acceptable.

- **Analytical Detection Levels**

Reported analytical detection levels are compared against the 100 Area Remedial Action Sampling and Analysis Plan TDLs to ensure that laboratory detection levels meet the required criteria. All reported detection limits met the analyte specific TDL.

- **Completeness**

Data package No. H1367-LVI (SDG No. H1367) was submitted for validation and verified for completeness. Completeness is based on the percentage of data determined to be valid (i.e., not rejected). The completion percentage was 100%.

MAJOR DEFICIENCIES

None found.

MINOR DEFICIENCIES

Due to a matrix spike recovery of 64.9%, all chromium VI results were qualified as estimates and flagged "J/UJ". Data flagged "J" is an estimate, but under the BHI validation SOW, the data may be usable for decision-making purposes. All other validated results are considered accurate within the standard error associated with the methods.

REFERENCES

BHI, MRB-SBB-A23665, *Validation Statement of Work*, Bechtel Hanford Incorporated, September 5, 1997.

DOE/RL-96-22, Rev. 2, *100 Area Remedial Action Sampling and Analysis Plan*, U.S. Department of Energy, September 2000.

Appendix 1

Glossary of Data Reporting Qualifiers

Qualifiers which may be applied by data validators in compliance with BHI validation SOW are as follows:

U - Indicates the compound or analyte was analyzed for and not detected in the sample. The value reported is the sample quantitation limit corrected for sample dilution and moisture content by the laboratory.

UJ - Indicates the compound or analyte was analyzed for and not detected in the sample. Due to a minor QC deficiency identified during the data validation, the associated quantitation limit is an estimate.

J - Indicates the compound or analyte was analyzed for and detected. Due to a minor QC deficiency identified during the data validation, the associated concentration is an estimate, but the data are usable for decision-making purposes.

BJ - Applied to inorganic analyses only. Indicates the analyte concentration was greater than the IDL but less than the CRDL and is considered an estimated value.

R - Indicates the compound or analyte was analyzed for, detected, and due to an identified major QC deficiency, the data are unusable.

UR - Indicates the compound or analyte was analyzed for and not detected in the sample. Additionally, the data is unusable due to an identified major QC deficiency.

NJ - Indicates presumptive evidence of a compound at an estimated value. The data may not be valid for some specific applications (i.e., usable for decision-making purposes).

N - Indicates presumptive evidence of a compound. The data may not be valid for some specific applications (i.e., usable for decision-making purposes).

Appendix 2

Summary of Data Qualification

DATA QUALIFICATION SUMMARY

SDG: H1367	REVIEWER: TLI	DATE: 6/19/01	PAGE 1 OF 1
COMMENTS:			
COMPOUND	QUALIFIER	SAMPLES AFFECTED	REASON
Chromium VI	J/UJ	All	MS percent recovery

Appendix 3

Qualified Data Summary and Annotated Laboratory Reports

Project: BECHTEL-HANFORD																					
Laboratory: LLI																					
Case	SDG: H1367																				
Sample Number		B12400		B12401		B12402		B12403		B12404		B12405		B12406		B12407		B12408			
Remarks																					
Sample Date		5/24/01		5/24/01		5/24/01		5/24/01		5/24/01		5/24/01		5/24/01		5/24/01		5/24/01			
Inorganics	TDL	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q
Silver	10	0.09	U	0.1	U	0.1	U	0.1	U	0.09	U	0.09	U	0.1	U	0.1	U	0.1	U		
Arsenic	51.05	4.6		3.4		2.9		3.4		3.1		3.1		3.3		2.7		3.0			
Barium		67.2		66.0		66.5		74.7		66.9		65.1		76.5		68.4		64.2			
Cadmium		0.03	U	0.03	U	0.06		0.19		0.03	U	0.03	U	0.03	U	0.03	U	0.03	U		
Chromium	0.5	9.1		9.8		16.9		10.7		9.2		9.3		8.8		7.8		8.1			
Manganese		263		254		253		307		294		281		287		269		265			
Lead	2	5.7		15.8		11.5		20.2		8.9		14.3		7.1		5.4		15.1			
Selenium	5	0.24	U	0.25	U	0.26	U	0.25	U	0.25	U	0.24	U	0.25	U	0.25	U	0.29			
Zinc		48.6		122		59.7		94.3		39.6		37.0		37.9		36.3		36.6			
Chromium VI	0.5	0.41	UJ	0.42	UJ	0.42	UJ	0.41	UJ	0.41	UJ	0.41	UJ	0.41	UJ	0.41	UJ	0.41	UJ		

Laboratory applied non-detect qualifiers "U" have been included in this table to minimize miss-interpretation of results. All other qualifiers shown were applied during validation.

Project: BECHTEL-HANFORD																					
Laboratory: LLI																					
Case	SDG: H1367																				
Sample Number		B12409		B12410		B12411		B12412		B123V5		B123V6		B123V7		B123V8		B123V9			
Remarks								Duplicate													
Sample Date		5/24/01		5/24/01		5/24/01		5/24/01		5/24/01		5/24/01		5/24/01		5/24/01		5/24/01			
Inorganic Anayals	CRDL	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q
Silver	10	0.09	U	0.09	U	0.09	U	0.09	U	0.09	U	0.1	U	0.09	U	0.1	U	0.09	U		
Arsenic	51.05	3.5		3.3		2.8		2.8		3.2		2.8		2.3		2.7		2.7			
Barium		79.4		89.6		78.0		70.9		67.8		78.6		63.6		61.2		60.6			
Cadmium		0.03	U	0.03	U	0.03	U	0.03		0.05		0.03		0.04		0.09		0.04			
Chromium	0.5	9.9		10.6		8.6		8.4		10.2		8.9		6.4		10.8		11.6			
Manganese		285		342		285		278		284		309		260		284		266			
Lead	2	7.2		6.8		6.4		6.2		5.0		5.6		3.7		4.8		5.7			
Selenium	5	0.24	U	0.24	U	0.24	U	0.25	U	0.25	U	0.25	U	0.25	U	0.25	U	0.24	U		
Zinc		39.0		40.4		38.1		37.2		69.8		40.1		42.4		46.4		56.2			
Chromium VI	0.5	2.1	J	0.40	UJ	0.40	UJ	0.41	UJ	0.40	UJ	0.41	UJ	0.82	J	0.41	UJ	0.50	J		

Laboratory applied non-detect qualifiers "U" have been included in this table to minimize miss-interpretation of results. All other qualifiers shown were applied during validation.

Project: BECHTEL-HANFORD																			
Laboratory: LLI																			
Case	SDG: H1367																		
Sample Number		B123W0		B123W1		B123W2		B123W3											
Remarks								Duplicate											
Sample Date		5/24/01		5/24/01		5/24/01		5/24/01											
Inorganic Anaysis	CRDL	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q
Silver	10	0.1	U	0.10	U	0.12	U	0.1	U										
Arsenic	51.05	2.8		1.6		2.2		2.1											
Barium		72.3		50.6		52.6		64.7											
Cadmium		0.32		0.15		0.04	U	0.07											
Chromium	0.5	9.8		4.2		3.3		5.3											
Manganese		313		217		185		245											
Lead	2	5.7		4.0		2.7		5.2											
Selenium	5	0.26	U	0.27	U	0.32	U	0.28											
Zinc		77.7		43.2		36.0		58.0											
Chromium VI	0.5	0.54	J	0.43	UJ	0.50	UJ	0.42	UJ										

Laboratory applied non-detect qualifiers "U" have been included in this table to minimize miss-interpretation of results. All other qualifiers shown were applied during validation.

Lionville Lababoratory, Inc.

INORGANICS DATA SUMMARY REPORT 06/05/01

CLIENT: TWOHANFORD B01-094 H1367 LVL LOT #: 0105L867
WORK ORDER: 11343-606-001-9999-00

SAMPLE	SITE ID	ANALYTE	RESULT		UNITS	REPORTING LIMIT	DILUTION FACTOR
-001	B12400	% Solids	98.4		%	0.01	1.0
		Chromium VI	0.41	uJ	MG/KG	0.41	1.0
-002	B12401	% Solids	96.1		%	0.01	1.0
		Chromium VI	0.42	uJ	MG/KG	0.42	1.0
-003	B12402	% Solids	95.2		%	0.01	1.0
		Chromium VI	0.42	uJ	MG/KG	0.42	1.0
-004	B12403	% Solids	97.0		%	0.01	1.0
		Chromium VI	0.41	uJ	MG/KG	0.41	1.0
-005	B12404	% Solids	98.5		%	0.01	1.0
		Chromium VI	0.41	uJ	MG/KG	0.41	1.0
-006	B12405	% Solids	98.5		%	0.01	1.0
		Chromium VI	0.41	uJ	MG/KG	0.41	1.0
-007	B12406	% Solids	98.3		%	0.01	1.0
		Chromium VI	0.41	uJ	MG/KG	0.41	1.0
-008	B12407	% Solids	97.0		%	0.01	1.0
		Chromium VI	0.41	uJ	MG/KG	0.41	1.0
-009	B12408	% Solids	98.2		%	0.01	1.0
		Chromium VI	0.41	uJ	MG/KG	0.41	1.0
-010	B12409	% Solids	98.4		%	0.01	1.0
		Chromium VI	2.1	J	MG/KG	0.41	1.0
-011	B12410	% Solids	99.1		%	0.01	1.0
		Chromium VI	0.40	uJ	MG/KG	0.40	1.0

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Lionville Lababoratory, Inc.

INORGANICS DATA SUMMARY REPORT 06/05/01

CLIENT: TNUHANFORD B01-094 H1367 LVL LOT #: G105L867
WORK ORDER: 11343-606-001-9999-00

SAMPLE	SITE ID	ANALYTE	RESULT	UNITS	REPORTING LIMIT	DILUTION FACTOR
-012	B12411	% Solids	98.8	%	0.01	1.0
		Chromium VI	0.40 uJ	MG/KG	0.40	1.0
-013	B12412	% Solids	98.6	%	0.01	1.0
		Chromium VI	0.41 uJ	MG/KG	0.41	1.0
-014	B123V5	% Solids	98.6	%	0.01	1.0
		Chromium VI	0.40 uJ	MG/KG	0.40	1.0
-015	B123V6	% Solids	98.6	%	0.01	1.0
		Chromium VI	0.41 uJ	MG/KG	0.41	1.0
-016	B123V7	% Solids	98.6	%	0.01	1.0
		Chromium VI	0.82 J	MG/KG	0.41	1.0
-017	B123V8	% Solids	98.0	%	0.01	1.0
		Chromium VI	0.41 uJ	MG/KG	0.41	1.0
-018	B123V9	% Solids	98.7	%	0.01	1.0
		Chromium VI	0.50 J	MG/KG	0.40	1.0
-019	B123W0	% Solids	98.4	%	0.01	1.0
		Chromium VI	0.54 J	MG/KG	0.41	1.0
-020	B123W1	% Solids	94.0	%	0.01	1.0
		Chromium VI	0.43 uJ	MG/KG	0.43	1.0
-021	B123W2	% Solids	80.8	%	0.01	1.0
		Chromium VI	0.50 uJ	MG/KG	0.50	1.0
-022	B123W3	% Solids	96.4	%	0.01	1.0
		Chromium VI	0.42 uJ	MG/KG	0.42	1.0

6/19/01

Lionville Laboratory, Inc.

INORGANICS DATA SUMMARY REPORT 06/01/01

CLIENT: TMJ-HANFORD B01-094 LVL LOT #: 0105L867

WORK ORDER: 11343-606-001-9999-00

SAMPLE	SITE ID	ANALYTE	RESULT	UNITS	REPORTING LIMIT	DILUTION FACTOR
-001	B12400	Silver, Total	0.09 u	MG/KG	0.09	1.0
		Arsenic, Total	4.6	MG/KG	0.22	1.0
		Barium, Total	67.2	MG/KG	0.02	1.0
		Cadmium, Total	0.03 u	MG/KG	0.03	1.0
		Chromium, Total	9.1	MG/KG	0.08	1.0
		Manganese, Total	263	MG/KG	0.009	1.0
		Lead, Total	5.7	MG/KG	0.24	1.0
		Selenium, Total	0.24 u	MG/KG	0.24	1.0
		Zinc, Total	48.6	MG/KG	0.03	1.0
-002	B12401	Silver, Total	0.1 u	MG/KG	0.1	1.0
		Arsenic, Total	3.4	MG/KG	0.22	1.0
		Barium, Total	66.0	MG/KG	0.02	1.0
		Cadmium, Total	0.03 u	MG/KG	0.03	1.0
		Chromium, Total	9.8	MG/KG	0.09	1.0
		Manganese, Total	254	MG/KG	0.01	1.0
		Lead, Total	15.8	MG/KG	0.25	1.0
		Selenium, Total	0.25 u	MG/KG	0.25	1.0
		Zinc, Total	122	MG/KG	0.03	1.0
-003	B12402	Silver, Total	0.1 u	MG/KG	0.1	1.0
		Arsenic, Total	2.9	MG/KG	0.22	1.0
		Barium, Total	66.5	MG/KG	0.02	1.0
		Cadmium, Total	0.06	MG/KG	0.03	1.0
		Chromium, Total	16.9	MG/KG	0.09	1.0
		Manganese, Total	253	MG/KG	0.01	1.0
		Lead, Total	11.5	MG/KG	0.25	1.0
		Selenium, Total	0.25 u	MG/KG	0.25	1.0
		Zinc, Total	59.7	MG/KG	0.03	1.0

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Lionville Lababoratory, Inc.

INORGANICS DATA SUMMARY REPORT - 06/01/01

CLIENT: TNU-HANFORD B01-094 LVL LOT #: 0105L867

WORK ORDER: 11343-606-001-9999-00

SAMPLE	SITE ID	ANALYTE	RESULT	UNITS	REPORTING LIMIT	DILUTION FACTOR
-004	B12403	Silver, Total	0.1 u	MG/KG	0.1	1.0
		Arsenic, Total	3.4	MG/KG	0.22	1.0
		Barium, Total	74.7	MG/KG	0.02	1.0
		Cadmium, Total	0.19	MG/KG	0.03	1.0
		Chromium, Total	10.7	MG/KG	0.09	1.0
		Manganese, Total	307	MG/KG	0.01	1.0
		Lead, Total	20.2	MG/KG	0.25	1.0
		Selenium, Total	0.25 u	MG/KG	0.25	1.0
		Zinc, Total	94.3	MG/KG	0.03	1.0
-005	B12404	Silver, Total	0.09 u	MG/KG	0.09	1.0
		Arsenic, Total	3.1	MG/KG	0.22	1.0
		Barium, Total	66.9	MG/KG	0.02	1.0
		Cadmium, Total	0.03 u	MG/KG	0.03	1.0
		Chromium, Total	9.2	MG/KG	0.09	1.0
		Manganese, Total	294	MG/KG	0.009	1.0
		Lead, Total	6.9	MG/KG	0.25	1.0
		Selenium, Total	0.25 u	MG/KG	0.25	1.0
		Zinc, Total	39.6	MG/KG	0.03	1.0
-006	B12405	Silver, Total	0.09 u	MG/KG	0.09	1.0
		Arsenic, Total	3.1	MG/KG	0.22	1.0
		Barium, Total	65.1	MG/KG	0.02	1.0
		Cadmium, Total	0.03 u	MG/KG	0.03	1.0
		Chromium, Total	9.3	MG/KG	0.08	1.0
		Manganese, Total	281	MG/KG	0.009	1.0
		Lead, Total	14.3	MG/KG	0.24	1.0
		Selenium, Total	0.24 u	MG/KG	0.24	1.0
		Zinc, Total	37.0	MG/KG	0.03	1.0

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Lionville Lababoratory, Inc.

INORGANICS DATA SUMMARY REPORT . 06/01/01

CLIENT: TWU-HANFORD B01-094 LVL LOT #: 0105L867
WORK ORDER: 11343-606-001-9999-00

SAMPLE	SITE ID	ANALYTE	RESULT	UNITS	REPORTING LIMIT	DILUTION FACTOR
-007	B12406	Silver, Total	0.1 u	MG/KG	0.1	1.0
		Arsenic, Total	3.3	MG/KG	0.22	1.0
		Barium, Total	75.5	MG/KG	0.02	1.0
		Cadmium, Total	0.03 u	MG/KG	0.03	1.0
		Chromium, Total	8.8	MG/KG	0.09	1.0
		Manganese, Total	287	MG/KG	0.01	1.0
		Lead, Total	7.1	MG/KG	0.25	1.0
		Selenium, Total	0.25 u	MG/KG	0.25	1.0
		Zinc, Total	37.9	MG/KG	0.03	1.0
-008	B12407	Silver, Total	0.1 u	MG/KG	0.1	1.0
		Arsenic, Total	2.7	MG/KG	0.22	1.0
		Barium, Total	68.4	MG/KG	0.02	1.0
		Cadmium, Total	0.03 u	MG/KG	0.03	1.0
		Chromium, Total	7.8	MG/KG	0.09	1.0
		Manganese, Total	269	MG/KG	0.01	1.0
		Lead, Total	5.4	MG/KG	0.25	1.0
		Selenium, Total	0.25 u	MG/KG	0.25	1.0
		Zinc, Total	36.3	MG/KG	0.03	1.0
-009	B12408	Silver, Total	0.1 u	MG/KG	0.1	1.0
		Arsenic, Total	3.0	MG/KG	0.22	1.0
		Barium, Total	64.2	MG/KG	0.02	1.0
		Cadmium, Total	0.03 u	MG/KG	0.03	1.0
		Chromium, Total	8.1	MG/KG	0.09	1.0
		Manganese, Total	265	MG/KG	0.01	1.0
		Lead, Total	15.1	MG/KG	0.25	1.0
		Selenium, Total	0.29	MG/KG	0.25	1.0
		Zinc, Total	36.6	MG/KG	0.03	1.0

6/19/01

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156

Lionville Lababoratory, Inc.

INORGANICS DATA SUMMARY REPORT 06/01/01

CLIENT: TMU-HANFORD S01-094 LVL LOT #: 0105L867

WORK ORDER: 11343-606-001-9999-00

SAMPLE	SITE ID	ANALYTE	RESULT	UNITS	REPORTING LIMIT	DILUTION FACTOR
-010	B12409	Silver, Total	0.09 u	MG/KG	0.09	1.0
		Arsenic, Total	3.5	MG/KG	0.21	1.0
		Barium, Total	79.4	MG/KG	0.02	1.0
		Cadmium, Total	0.03 u	MG/KG	0.03	1.0
		Chromium, Total	9.9	MG/KG	0.08	1.0
		Manganese, Total	285	MG/KG	0.009	1.0
		Lead, Total	7.2	MG/KG	0.24	1.0
		Selenium, Total	0.24 u	MG/KG	0.24	1.0
		Zinc, Total	39.0	MG/KG	0.03	1.0
-011	B12410	Silver, Total	0.09 u	MG/KG	0.09	1.0
		Arsenic, Total	3.3	MG/KG	0.21	1.0
		Barium, Total	89.6	MG/KG	0.02	1.0
		Cadmium, Total	0.03 u	MG/KG	0.03	1.0
		Chromium, Total	10.6	MG/KG	0.08	1.0
		Manganese, Total	342	MG/KG	0.009	1.0
		Lead, Total	6.8	MG/KG	0.24	1.0
		Selenium, Total	0.24 u	MG/KG	0.24	1.0
		Zinc, Total	40.4	MG/KG	0.03	1.0
-012	B12411	Silver, Total	0.09 u	MG/KG	0.09	1.0
		Arsenic, Total	2.8	MG/KG	0.21	1.0
		Barium, Total	78.0	MG/KG	0.02	1.0
		Cadmium, Total	0.03 u	MG/KG	0.03	1.0
		Chromium, Total	8.6	MG/KG	0.08	1.0
		Manganese, Total	285	MG/KG	0.009	1.0
		Lead, Total	6.4	MG/KG	0.24	1.0
		Selenium, Total	0.24 u	MG/KG	0.24	1.0
		Zinc, Total	36.1	MG/KG	0.03	1.0

RK 6/19/01

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Lionville Lababoratory, Inc.

INORGANICS DATA SUMMARY REPORT 06/01/01

CLIENT: TNU-HANFORD E01-094 LVL LOT #: 0105L867
WORK ORDER: 11343-606-001-9999-00

SAMPLE	SITE ID	ANALYTE	RESULT	UNITS	REPORTING LIMIT	DILUTION FACTOR
-013	B12412	Silver, Total	0.09 u	MG/KG	0.09	1.0
		Arsenic, Total	2.8	MG/KG	0.22	1.0
		Barium, Total	70.9	MG/KG	0.02	1.0
		Cadmium, Total	0.03	MG/KG	0.03	1.0
		Chromium, Total	8.4	MG/KG	0.09	1.0
		Manganese, Total	278	MG/KG	0.009	1.0
		Lead, Total	6.2	MG/KG	0.25	1.0
		Selenium, Total	0.25 u	MG/KG	0.25	1.0
		Zinc, Total	37.2	MG/KG	0.03	1.0
-014	B123V5	Silver, Total	0.09 u	MG/KG	0.09	1.0
		Arsenic, Total	3.2	MG/KG	0.22	1.0
		Barium, Total	67.8	MG/KG	0.02	1.0
		Cadmium, Total	0.05	MG/KG	0.03	1.0
		Chromium, Total	10.2	MG/KG	0.09	1.0
		Manganese, Total	284	MG/KG	0.009	1.0
		Lead, Total	5.0	MG/KG	0.25	1.0
		Selenium, Total	0.25 u	MG/KG	0.25	1.0
		Zinc, Total	69.8	MG/KG	0.03	1.0
-015	B123V6	Silver, Total	0.1 u	MG/KG	0.1	1.0
		Arsenic, Total	2.8	MG/KG	0.22	1.0
		Barium, Total	76.6	MG/KG	0.02	1.0
		Cadmium, Total	0.03	MG/KG	0.03	1.0
		Chromium, Total	8.9	MG/KG	0.09	1.0
		Manganese, Total	309	MG/KG	0.01	1.0
		Lead, Total	5.6	MG/KG	0.25	1.0
		Selenium, Total	0.25 u	MG/KG	0.25	1.0
		Zinc, Total	40.1	MG/KG	0.03	1.0

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Lionville Lababoratory, Inc.

INORGANICS DATA SUMMARY REPORT 06/01/01

CLIENT: TNU-HANFORD B01-094 LVL LOT #: 0105L867

WORK ORDER: 11343-606-001-9999-00

SAMPLE	SITE ID	ANALYTE	RESULT	UNITS	REPORTING LIMIT	DILUTION FACTOR
-016	B123V7	Silver, Total	0.09 u	MG/KG	0.09	1.0
		Arsenic, Total	2.3	MG/KG	0.22	1.0
		Barium, Total	63.6	MG/KG	0.02	1.0
		Cadmium, Total	0.04	MG/KG	0.03	1.0
		Chromium, Total	6.4	MG/KG	0.09	1.0
		Manganese, Total	260	MG/KG	0.009	1.0
		Lead, Total	3.7	MG/KG	0.25	1.0
		Selenium, Total	0.25 u	MG/KG	0.25	1.0
		Zinc, Total	42.4	MG/KG	0.03	1.0
-017	B123V8	Silver, Total	0.1 u	MG/KG	0.1	1.0
		Arsenic, Total	2.7	MG/KG	0.22	1.0
		Barium, Total	61.2	MG/KG	0.02	1.0
		Cadmium, Total	0.09	MG/KG	0.03	1.0
		Chromium, Total	10.8	MG/KG	0.09	1.0
		Manganese, Total	284	MG/KG	0.01	1.0
		Lead, Total	4.8	MG/KG	0.25	1.0
		Selenium, Total	0.25 u	MG/KG	0.25	1.0
		Zinc, Total	46.4	MG/KG	0.03	1.0
-018	B123V9	Silver, Total	0.09 u	MG/KG	0.09	1.0
		Arsenic, Total	2.7	MG/KG	0.21	1.0
		Barium, Total	60.6	MG/KG	0.02	1.0
		Cadmium, Total	0.04	MG/KG	0.03	1.0
		Chromium, Total	11.6	MG/KG	0.08	1.0
		Manganese, Total	266	MG/KG	0.009	1.0
		Lead, Total	5.7	MG/KG	0.24	1.0
		Selenium, Total	0.24 u	MG/KG	0.24	1.0
		Zinc, Total	56.2	MG/KG	0.03	1.0

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Lionville Lababoratory, Inc.

INORGANICS DATA SUMMARY REPORT ' 06/01/01

CLIENT: TNU-HANFORD E01-094 LVL LOT #: 0105L867

WORK ORDER: 11343-606-001-9999-00

SAMPLE	SITE ID	ANALYTE	RESULT	UNITS	REPORTING LIMIT	DILUTION FACTOR
-019	B123W0	Silver, Total	0.1 u	MG/KG	0.1	1.0
		Arsenic, Total	2.8	MG/KG	0.23	1.0
		Barium, Total	72.3	MG/KG	0.02	1.0
		Cadmium, Total	0.32	MG/KG	0.03	1.0
		Chromium, Total	9.8	MG/KG	0.09	1.0
		Manganese, Total	313	MG/KG	0.01	1.0
		Lead, Total	5.7	MG/KG	0.26	1.0
		Selenium, Total	0.26 u	MG/KG	0.26	1.0
		Zinc, Total	77.7	MG/KG	0.03	1.0
-020	B123N1	Silver, Total	0.10 u	MG/KG	0.10	1.0
		Arsenic, Total	1.6	MG/KG	0.24	1.0
		Barium, Total	50.6	MG/KG	0.02	1.0
		Cadmium, Total	0.15	MG/KG	0.03	1.0
		Chromium, Total	4.2	MG/KG	0.09	1.0
		Manganese, Total	217	MG/KG	0.01	1.0
		Lead, Total	4.0	MG/KG	0.27	1.0
		Selenium, Total	0.27 u	MG/KG	0.27	1.0
		Zinc, Total	43.2	MG/KG	0.03	1.0
-021	B123N2	Silver, Total	0.12 u	MG/KG	0.12	1.0
		Arsenic, Total	2.2	MG/KG	0.28	1.0
		Barium, Total	52.6	MG/KG	0.02	1.0
		Cadmium, Total	0.04 u	MG/KG	0.04	1.0
		Chromium, Total	3.3	MG/KG	0.11	1.0
		Manganese, Total	185	MG/KG	0.01	1.0
		Lead, Total	2.7	MG/KG	0.32	1.0
		Selenium, Total	0.32 u	MG/KG	0.32	1.0
		Zinc, Total	36.0	MG/KG	0.04	1.0

6/19/01

Lionville Lababoratory, Inc.

INORGANICS DATA SUMMARY REPORT 06/01/01

CLIENT: TNU-HANFORD E01-094 LVL LOT #: 0105L867

WORK ORDER: 11343-606-001-9999-00

SAMPLE	SITE ID	ANALYTE	RESULT	UNITS	REPORTING LIMIT	DILUTION FACTOR
-022	B123W3	Silver, Total	0.1 u	MG/KG	0.1	1.0
		Arsenic, Total	2.1	MG/KG	0.23	1.0
		Barium, Total	64.7	MG/KG	0.02	1.0
		Cadmium, Total	0.07	MG/KG	0.03	1.0
		Chromium, Total	5.3	MG/KG	0.09	1.0
		Manganese, Total	245	MG/KG	0.01	1.0
		Lead, Total	5.2	MG/KG	0.26	1.0
		Selenium, Total	0.29	MG/KG	0.26	1.0
		Zinc, Total	58.0	MG/KG	0.03	1.0

6/19/01

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Appendix 4

Laboratory Narrative and Chain-of-Custody Documentation

Lionville Lababoratory, Inc.

INORGANICS DATA SUMMARY REPORT 06/01/01

CLIENT: TNU-HANFORD B01-094 LVL LOT #: 0105L867

WORK ORDER: 11343-606-001-9999-00

SAMPLE	SITE ID	ANALYTE	RESULT	UNITS	REPORTING LIMIT	DILUTION FACTOR
-022	B123N3	Silver, Total	0.1 u	MG/KG	0.1	1.0
		Arsenic, Total	2.1	MG/KG	0.23	1.0
		Barium, Total	64.7	MG/KG	0.02	1.0
		Cadmium, Total	0.07	MG/KG	0.03	1.0
		Chromium, Total	5.3	MG/KG	0.09	1.0
		Manganese, Total	245	MG/KG	0.01	1.0
		Lead, Total	5.2	MG/KG	0.26	1.0
		Selenium, Total	0.29	MG/KG	0.26	1.0
		Zinc, Total	58.0	MG/KG	0.03	1.0

6/19/01

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LVLI
LIONVILLE LABORATORY INC.

Analytical Report

Client: TNU-HANFORD B01-094
LVL#: 0105L867
SDG/SAF#: H1367/B01-094

W.O.#: 11343-606-001-9999-00
Date Received: 05-25-01

METALS CASE NARRATIVE

1. This narrative covers the analyses of 22 soil samples.

2. The samples were prepared and analyzed in accordance with methods checked on the attached glossary.

3. All analyses were performed within the required holding times.

4. All cooler temperatures have been recorded on the Chain of Custody.

5. All Initial and Continuing Calibration Verifications (ICV/CCVs) were within the 90-110% control limits.

6. All Initial and Continuing Calibration Blanks (ICB/CCBs) were within control limits (less than the PQL).

7. All preparation/method blanks (MB) were within method criteria {less than the Practical Quantitation Limit (3X the IDL), MB value less than 5% of the RCRA limit, or samples greater than 20X MB value}. Refer to the Inorganics Method Blank Data Summary.

8. All ICP Interference Check Standards were within control limits.

9. All laboratory control samples (LCS) were within the 80-120% control limits. Refer to the Inorganics Laboratory Control Standards Report.

10. All matrix spike (MS) and matrix spike duplicate (MSD) recoveries were within the 75-125% control limits. Refer to the Inorganics Accuracy Report.

11. All MSs and MSDs were within the 20% Relative Percent Difference (RPD) control limits. Refer to the Inorganics Duplicate Spike Report.

12. All duplicate analyses were within the 20% Relative Percent Difference (RPD) control limits. Refer to the Inorganics Precision Report.

208 Welsh Pool Road • Lionville, PA 19341-1333 • (610) 280-3000 • Fax (610) 280-3041

13. For the purposes of this report, the data has been reported to the Instrument Detection Limit (IDL). Values between the IDL and the Practical Quantitation Limit (PQL) are acquired in a region of less-certain quantification.

14. I certify that this sample data package is in compliance with SOW requirements, both technically and for completeness, other than the conditions detailed above. Release of the data contained in this hard-copy data package has been authorized by the Laboratory Manager or a designee, as verified by the following signature.

15. As of January 27, 2001, Recra LabNet Philadelphia became Lionville Laboratory Incorporated. Some forms may still reference Recra LabNet Philadelphia.

Iain Daniels
Deputy Laboratory Manager
Lionville Laboratory Incorporated

06-04-01
Date

jjw\m05-867

LIONVILLE LABORATORY INC.

Analytical Report

Client: TNU-HANFORD B01-094 H1367
LVL#: 0105L867

W.O.#: 11343-601-001-9999-00
Date Received: 05-25-01

INORGANIC NARRATIVE

1. This narrative covers the analyses of 22 soil samples.

2. The samples were prepared and analyzed in accordance with the methods checked on the attached glossary.

3. Sample holding times as required by the method and/or contract were met.

4. The cooler temperatures were recorded on the chain of custody.

5. The method blanks for Chromium VI were within the method criteria.

6. The Laboratory Control Samples (LCS) for Chromium VI were within the laboratory control limits.

7. The matrix spike (MS) recovery for Insoluble Chromium VI was within the 75-125% control limits, however the MS recovery for Soluble Chromium VI was below the control limit that may be attributed to sample inhomogeneity.

8. The replicate analyses were within the 20% Relative Percent Difference (RPD) control limit.

9. Results for solid samples are reported on a dry weight basis.

10. I certify that this sample data package is in compliance with SOW requirements, both technically and for completeness, other than the conditions detailed above. Release of the data contained in this hard copy package has been authorized by the Laboratory Manager or a designee, as verified by the following signature.

Iain Daniels
Deputy Laboratory Manager
Lionville Laboratory Incorporated

06-06-01
Date

njpl\05-867

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Bechtel Hanford Inc.	CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST	B01-094-7	Page 1 of 3

Collector	Company Contact / Telephone No.	Project Coordinator	Price Code / Data Turnaround
Thomas G.	Lerch J. (509) 373-5904	TRENT, SJ	8B / 7 Days
Project Designation	**Sampling Location**	**SAF No.**	**Air Quality**
600-23 Verification Sampling - Soil	600-23 Dig Site	B01-094	[ ]
Ice Chest No. ERC49-0161 (50ft)	**Field Logbook No.** EL-1518	**COA** R600232E00	**Method of Shipment** Fed Ex
Shipped To TMA/RECRA	**Offsite Property No.** A010262	**Bill of Lading/Air Bill No.** 423579541-4631

POSSIBLE SAMPLE HAZARDS/REMARKS
Samples did not originate in radiological controlled area. No total activity associated with sample/samples.

Special Handling Ambient Storage

RT 5-24-01

Preservation	None	Cool 4C											
Type of Container	aG	aG											
No. of Container(s)	1	1											
Volume	500mL	40mL 120mL	BT 5/24/01										

SAMPLE ANALYSIS

				See item (1) in Special Instructions.	Chromium Hex - 7196								
Sample No.	Matrix *	Sample Date	Sample Time										
B12405	SOIL	5/24/01	0815	X	X								
B12406	SOIL	5/24/01	0845	X	X								
B12407	SOIL	5/24/01	0855	X	X								
B12408	SOIL	5/24/01	0920	X	X								
B12409	SOIL	5/24/01	0930	X	X								

CHAIN OF POSSESSION — Sign/Print Names

Relinquished By/Removed From	Date/Time	Received By/Stored In	Date/Time
Greg Thomas / Greg Thomas	5/24/01 1195	R. Thorne	5-24-01 1195
R. Thorne	5.24.01 1200	FEDEX	
Fed Ex	5-25-01 / 0845	Inez Stoltzfus	

SPECIAL INSTRUCTIONS

(1) ICP Metals - 6010A (SW-846) (Arsenic, Barium, Cadmium, Chromium, Lead, Manganese, Selenium, Silver, Zinc)

Matrix *
S - Soil
SE - Sediment
SO - Solid
SL - Sludge
W - Water
O - Oil
A - Air
DS - Drum Solids
DL - Drum Liquids
T - Tissue
WI - Wipe
L - Liquid
V - Vegetation
X - Other

LABORATORY SECTION	Received By	Title	Date/Time
FINAL SAMPLE DISPOSITION	Disposal Method	Disposed By	Date/Time

BHI-EE-011 (10/99)

Bechtel Hanford Inc.	CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST	B01-094-7	Page 1 of 3

Collector: Thomas G.	Company Contact: Lerch J. — Telephone No.: (509) 373-5904	Project Coordinator: TRENT, SJ	Price Code: 8B — Data Turnaround: 7 Days — Air Quality ☐
Project Designation: 600-23 Verification Sampling - Soil	Sampling Location: 600-23 Dig Site	SAF No.: B01-094	
Ice Chest No.: ERC 99-056 (4 of 7)	Field Logbook No.: EL-1518 — COA: R600232E00	Method of Shipment: Fed Ex	
Shipped To: TMA/RECRA	Offsite Property No.: A010262	Bill of Lading/Air Bill No.: 4285 7984 - 4620	

POSSIBLE SAMPLE HAZARDS/REMARKS
Samples did not originate in radiological controlled area. No total activity associated with sample/samples.

Special Handling and/or Storage FT 524.01

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Preservation	None	Cool 4C										
Type of Container	aG	aG										
No. of Container(s)	1	1										
Volume	500mL	60mL (20mL HT 5/24/01)										

SAMPLE ANALYSES

Sample No.	Matrix *	Sample Date	Sample Time	See Item (1) in Special Instructions	Chromium Hex - 7196							
B12400	SOIL	5/24/01	0655	X	X							
B12401	SOIL	5/24/01	0705	X	X							
B12402	SOIL	5/24/01	0720	X	X							
B12403	SOIL	5/24/01	0730	X	X							
B12404	SOIL	5/24/01	0805	X	X							

CHAIN OF POSSESSION	Sign/Print Names		
Relinquished By/Removed From: Greg Thomas Greg Thomas 5/24/01	Date/Time: 1105	Received By/Stored In: R Thomas	Date/Time: 1105 5.24.01
Relinquished By/Removed From: R Thomas 5.24.01	Date/Time: 1200	Received By/Stored In: FED EX	Date/Time:
Relinquished By/Removed From: Fed Ex 5-25-01	Date/Time: 0845	Received By/Stored In: Inez Stoltzfus	Date/Time:
Relinquished By/Removed From:	Date/Time:	Received By/Stored In:	Date/Time:
Relinquished By/Removed From:	Date/Time:	Received By/Stored In:	Date/Time:
Relinquished By/Removed From:	Date/Time:	Received By/Stored In:	Date/Time:

SPECIAL INSTRUCTIONS

(1) ICP Metals - 6010A (SW-846) (Arsenic, Barium, Cadmium, Chromium, Lead, Manganese, Selenium, Silver, Zinc)

Matrix *
S - Soil
SE - Sediment
SO - Solid
SU - Sludge
W - Water
O - Oil
A - Air
DS - Drum Solids
DL - Drum Liquids
T - Tissue
WI - Wipe
L - Liquid
V - Vegetation
C - Other

LABORATORY SECTION	Received By	Title	Date/Time
FINAL SAMPLE DISPOSITION	Disposal Method	Disposed By	Date/Time

BHI-EE-011 (10/99)

Bechtel Hanford Inc.	CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST		B01-094-7
Collector: Thomas G.	Company Contact: Lerch J. / Telephone No.: (509) 373-5904	Project Coordinator: TRENT, SJ	Price Code 8B / Data Turnaround: 7 Days
Project Designation: 600-23 Verification Sampling - Soil	Sampling Location: 600-23 Dig Site	SAF No.: B01-094	Air Quality ☐
Ice Chest No. ~~ERA~~ RT 5-24-01 (600) SML 150	Field Logbook No.: EL-1518 / COA: R600232E00	Method of Shipment: Fed Ex	
Shipped To: TMA/RECRA	Offsite Property No.: AØ10262	Bill of Lading/Air Bill No.: 42357954-4642	

POSSIBLE SAMPLE HAZARDS/REMARKS

Special Handling and/or Storage

Samples did not originate in radiological controlled area. No total activity associated with sample/samples. RT 5-24-01

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	None	Cool 4C
Preservation	None	Cool 4C
Type of Container	aG	aG
No. of Container(s)	1	1
Volume	500mL	~~60mL~~ 120 mL RT 5/24/01
SAMPLE ANALYSIS	See item (1) in Special Instructions.	Chromium Hex - 7196

Sample No.	Matrix *	Sample Date	Sample Time	ICP Metals	Chromium Hex
B12410	SOIL	5/24/01	0950	X	X
B12411	SOIL	5/24/01	1000	X	X
B12412	SOIL	5/24/01	1000	X	X
~~B12413~~	~~SOIL~~	~~5/24/01~~	~~1000~~	~~X~~	RT 5/24/01

CHAIN OF POSSESSION — Sign/Print Names

Relinquished By/Removed From	Date/Time	Received By/Stored In	Date/Time
Greg Thomas [signature]	5/24/01 1105	R Thomas [signature]	5-24-01 1105
R Thomas [signature]	5-24-01 1200	FEDEX	
FedEx	5-25-01 / 0845	Inez Stottefur [signature]	

SPECIAL INSTRUCTIONS

(1) ICP Metals - 6010A (SW-846) (Arsenic, Barium, Cadmium, Chromium, Lead, Manganese, Selenium, Silver, Zinc)

Matrix *: S=Soil, SE=Sediment, SO=Solid, SL=Sludge, W=Water, O=Oil, A=Air, DS=Drum Solids, DL=Drum Liquids, T=Tissue, WI=Wipe, L=Liquid, V=Vegetation, X=Other

LABORATORY SECTION	Received By	Title	Date/Time
FINAL SAMPLE DISPOSITION	Disposal Method	Disposed By	Date/Time

BHI-EE-011 (10/99)

Bechtel Hanford Inc.	CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST		B01-094-2	Page 1 of 2
Collector: Thomas G. Bowers	Company Contact: Lerch J.	Telephone No.: (509) 373-5904	Project Coordinator: TRENT, SJ	Price Code: 8B
Project Designation: 600-23 Verification Sampling - Soil	Sampling Location: 600-23 Dig Site		SAF No.: B01-094	Air Quality ☐
Ice Chest No.: ER 99-026 (1067)	Field Logbook No.: EL-1518	COA: R600232E00	Method of Shipment: Fed Ex	Data Turnaround: 7 Days
Shipped To: TMA/RECRA	Offsite Property No.: A-610267		Bill of Lading/Air Bill No.: 423579549-453	

POSSIBLE SAMPLE HAZARDS/REMARKS: <2000 pCi/g per historical RAD DATA

Special Handling and/or Storage

Preservation	None	Cool 4C									
Type of Container	aG	aG									
No. of Container(s)	1	1									
Volume	500mL	60mL 120mL	RT 5/23/01								

SAMPLE ANALYSIS: H1367 RC 6/4/01 H1365 Bowers 6/1/01

Sample No.	Matrix *	Sample Date	Sample Time	See Item (1) in Special Instructions	Chromium Hex - 7196
B123V5	SOIL	5-23-01	0730	X	X
B123V6	SOIL	5-23-01	0740	X	X
B123V7	SOIL	5-23-01	0745	X	X
B123V8	SOIL	5-23-01	0750	X	X
B123V9	SOIL	5-23-01	0800	X	X

CHAIN OF POSSESSION	Sign/Print Names		
Relinquished By/Removed From	Date/Time	Received By/Stored In	Date/Time
T Bowers / Bowers	5-23-01 1610	Ref 2B 3728	5.23.01/1610
Relinquished By/Removed From	Date/Time	Received By/Stored In	Date/Time
Ref 2B 3728	5.24.01 1000	RT RThorp	5.24.01 1000
Relinquished By/Removed From	Date/Time	Received By/Stored In	Date/Time
RT RThorp	5.24.01 1000	FEDEX	
Relinquished By/Removed From	Date/Time	Received By/Stored In	Date/Time
Fed Ex	5-25-01 /0845	Inez Stoltzfus	
Relinquished By/Removed From	Date/Time	Received By/Stored In	Date/Time
Relinquished By/Removed From	Date/Time	Received By/Stored In	Date/Time

SPECIAL INSTRUCTIONS

(1) ICP Metals - 6010A (SW-846) [Arsenic, Barium, Cadmium, Chromium, Lead, Manganese, Selenium, Silver, Zinc]

Samples stored in Ref.# 2B at the 3728 Shipping Facility on 5/23/01. Collector not available to relenquish samples on 5/24/01 for shipment. RT 5.24.0

LABORATORY COPY

Matrix *: S=Soil; SE=Sediment; SO=Solid; SL=Sludge; W=Water; O=Oil; A=Air; DS=Drum Solids; DL=Drum Liquids; T=Tissue; WI=Wipe; L=Liquid; V=Vegetation; X=Other

LABORATORY SECTION	Received By	Title	Date/Time
FINAL SAMPLE DISPOSITION	Disposal Method	Disposed By	Date/Time

BHI-EE-011 (10/99)

Bechtel Hanford Inc.	CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST		B01-094-2	Page 2 of 2
Collector: Thomas G. Bowers	Company Contact: Lerch J.	Telephone No.: (509) 373-5904	Project Coordinator: TRENT, SJ	Price Code: 8B; Air Quality ☐	Data Turnaround: 7 Days
Project Designation: 600-23 Verification Sampling - Soil	Sampling Location: 600-23 Dig Site		SAF No.: B01-094	
Ice Chest No.: ERC 46026/26f0	Field Logbook No.: EL-1518	COA: R600232E00	Method of Shipment: Fed Ex	
Shipped To: TMA/RECRA	Offsite Property No.: A0110267		Bill of Lading/Air Bill No.: 423574574653	

POSSIBLE SAMPLE HAZARDS/REMARKS: 42000 pCi/g per historical BHP DATA

Special Handling and/or Storage

Preservation	None	Cool 4C										
Type of Container	aG	aG										
No. of Container(s)	1	1										
Volume	500mL	500mL 120mL	AT 5/23/01									
SAMPLE ANALYSIS	See item (1) in Special Instructions.	Chromium Hex - 7196										

Sample No.	Matrix *	Sample Date	Sample Time									
B123W0	SOIL	5-23-01	0805	X	X							
B123W1	SOIL	5-23-01	0825	X	X							
B123W2	SOIL	5-23-01	0835	X	X							
B123W3	SOIL	5-23-01	0835	X	X							

CHAIN OF POSSESSION — Sign/Print Names

Relinquished By/Removed From	Date/Time	Received By/Stored In	Date/Time
Doug Bowers/Doug Bowers	5-23-01 1045	Ref 2B 3728	5-23-01 1045
Ref 2B 3728	5-24-01 1000	RT Thorne	5-24-01 1000
RT Thorne	5-24-01 1000	FEDEM	
Fed Ex	5-25-01 0845	Inez Stoltzfus	

SPECIAL INSTRUCTIONS

(1) ICP Metals - 6010A (SW-846) (Arsenic, Barium, Cadmium, Chromium, Lead, Manganese, Selenium, Silver, Zinc)

Samples stored in Ref. 2B at the 3728 Shipping Facility on 5-23-01
Collector not available to relinquish samples on 5-24-01 for shipment.

RT 5-24-01

LABORATORY COPY

Matrix *: S-Soil; SE-Sediment; SO-Solid; SD-Sludge; W-Water; O-Oil; A-Air; DS-Drum Solids; DL-Drum Liquids; T-Tissue; WI-Wipe; L-Liquid; V-Vegetation; X-Other

LABORATORY SECTION	Received By	Title	Date/Time
FINAL SAMPLE DISPOSITION	Disposal Method	Disposed By	Date/Time

BHI-EE-011 (10/99)

620000

Appendix 5

Data Validation Supporting Documentation

INORGANIC ANALYSIS DATA VALIDATION CHECKLIST

VALIDATION LEVEL:	A	B	C	D	E
PROJECT: 600-23 Verif - soil			DATA PACKAGE: H1367		
VALIDATOR: TLJ		LAB: LLI		DATE: 6/14/01	
CASE:			SDG: H1367		

ANALYSES PERFORMED

☐ CLP/ICP	☐ CLP/GFAA	☐ CLP/Hg	☐ CLP/Cyanide	☐	☐
☒ SW-846/ICP	☐ SW-846/GFAA	☐ SW-846/Hg	☐ SW-846 Cyanide	☒ Cr VI	☐

SAMPLES/MATRIX

B12400	B12401	B12402	B12403	B12404
B12405	B12406	B12407	B12408	B12409
B12410	B12411	B12412	B123V5	B123V6
B123V7	B123V8	B123V9	B123W0	B123W1
B123W2	B123W3			

1. DATA PACKAGE COMPLETENESS AND CASE NARRATIVE

Is technical verification documentation present? . . . . . Yes No (N/A)

Is a case narrative present? . . . . . (Yes) No N/A

Comments: _____

2. HOLDING TIMES

Are sample holding times acceptable? . . . . . (Yes) No N/A

Comments: _____

INORGANIC ANALYSIS DATA VALIDATION CHECKLIST

3. INSTRUMENT PERFORMANCE AND CALIBRATIONS

Were initial calibrations performed on all instruments? . . . . Yes No **(N/A)**
Are initial calibrations acceptable? . . . . Yes No **(N/A)**
Are ICP interference checks acceptable? . . . . Yes No **(N/A)**
Were ICV and CCV checks performed on all instruments? . . . . . Yes No **(N/A)**
Are ICV and CCV checks acceptable? . . . . Yes No **(N/A)**
Comments:

4. BLANKS

Were ICB and CCB checks performed for all applicable analyses? Yes No **(N/A)**
Are ICB and CCB results acceptable? . . . . Yes No **(N/A)**
Were preparation blanks analyzed? . . . . **(Yes)** No N/A
Are preparation blank results acceptable? . . . . **(Yes)** No N/A
Were field/trip blanks analyzed? . . . . Yes **(No)** N/A
Are field/trip blank results acceptable? . . . . Yes No **(N/A)**
Comments:

5. ACCURACY

Were spike samples analyzed? . . . . **(Yes)** No N/A
Are spike sample recoveries acceptable? . . . . Yes **(No)** N/A
Were laboratory control samples (LCS) analyzed? . . . . Yes No **(N/A)**
Are LCS recoveries acceptable? . . . . Yes No **(N/A)**
Comments: CR VI – J/UJ all 64%

INORGANIC ANALYSIS DATA VALIDATION CHECKLIST

6. PRECISION

Were laboratory duplicates analyzed? . . . . (Yes) No N/A
Are laboratory duplicate samples RPD values acceptable? . . . . (Yes) No N/A
Were ICP serial dilution samples analyzed? . . . . Yes No (N/A)
Are ICP serial dilution %D values acceptable? . . . . Yes No (N/A)
Are field duplicate RPD values acceptable? . . . . Yes (No) N/A
Are field split RPD values acceptable? . . . . Yes No (N/A)
Comments: FD 46% Chromium + Zinc W2/W3

7. FURNACE AA QUALITY CONTROL

Were duplicate injections performed as required? . . . . Yes No (N/A)
Are duplicate injection %RSD values acceptable? . . . . Yes No (N/A)
Were analytical spikes performed as required? . . . . Yes No (N/A)
Are analytical spike recoveries acceptable? . . . . Yes No (N/A)
Was MSA performed as required? . . . . Yes No (N/A)
Are MSA results acceptable? . . . . Yes No (N/A)
Comments:

8. REPORTED RESULTS AND DETECTION LIMITS

Are results reported for all requested analyses? . . . . (Yes) No N/A
Are all results supported in the raw data? . . . . Yes No (N/A)
Are results calculated properly? . . . . Yes No (N/A)
Do results meet the CRDLs? . . . . (Yes) ~~No~~ N/A
Comments: ~~46% Chromium 44% Zinc~~

~~CR VI - all unfiltered~~

Appendix 6

Additional Documentation Requested by Client

Lionville Lababoratory, Inc.

INORGANICS METHOD BLANK DATA SUMMARY PAGE 06/05/01

CLIENT: TMUHANFORD B01-094 H1367 LVL LOT #: 0105L867
WORK ORDER: 11343-606-001-9999-00

SAMPLE	SITE ID	ANALYTE	RESULT	UNITS	REPORTING LIMIT	DILUTION FACTOR
BLANK10	01LVI050-MB1	Chromium VI	0.40 u	MG/KG	0.40	1.0
BLANK10	01LVI051-MB1	Chromium VI	0.40 u	MG/KG	0.40	1.0

Livermore Laboratory, Inc.

INORGANICS ACCURACY REPORT 06/05/01

CLIENT: TMUHANFORD B01-094 H1367 LVL LOT #: 0105L467

WORK ORDER: 11143-606-001-9999-00

SAMPLE	SITE ID	ANALYTE	SPIKED SAMPLE	INITIAL RESULT	SPIKED AMOUNT	%RECOV	DILUTION FACTOR(SPK)
-020	B123W1	Soluble Chromium VI	2.9	0.43u	4.3	64.9	1.0
		Insoluble Chromium VI	1470	0.43u	1300	112.8	100
BLANK10	01LVI050-MB1	Soluble Chromium VI	4.3	0.40u	4.0	106.9	1.0
		Insoluble Chromium VI	1520	0.40u	1290	118.3	100
BLANK10	01LVI051-MB1	Soluble Chromium VI	4.0	0.40u	4.0	100.9	1.0
		Insoluble Chromium VI	1340	0.40u	1290	104.3	100

Lionville Lababoratory, Inc.

INORGANICS PRECISION REPORT 06/01/01

CLIENT: TNU-HANFORD B01-094 LVL LOT #: 0105L867

WORK ORDER: 11343-606-001-9999-00

SAMPLE	SITE ID	ANALYTE	INITIAL RESULT	REPLICATE	RPD	DILUTION FACTOR(REP)
-001REP	B12400	Silver, Total	0.09u	0.09u	NC	1.0
		Arsenic, Total	4.6	4.5	2.2	1.0
		Barium, Total	67.2	66.6	0.90	1.0
		Cadmium, Total	0.03u	0.03u	NC	1.0
		Chromium, Total	9.1	7.9	14.1	1.0
		Manganese, Total	263	280	6.5	1.0
		Lead, Total	5.7	6.3	10.0	1.0
		Selenium, Total	0.24u	0.24u	NC	1.0
		Zinc, Total	48.6	50.1	3.0	1.0

~~095~~ 025

Lionville Lababoratory, Inc.

INORGANICS DUPLICATE SPIKE REPORT 06/01/01

CLIENT: TMU-HANFORD B01-094 LVL LOT #: 0105L867

WORK ORDER: 11343-606-001-9999-00

SAMPLE	SITE ID	ANALYTE	SPIKE#1 %RECOV	SPIKE#2 %RECOV	%DIFF
-001	S12400	Silver, Total	93.6	93.6	0.00
		Arsenic, Total	90.6	90.3	0.35
		Barium, Total	95.0	92.9	2.1
		Cadmium, Total	91.5	89.4	2.4
		Chromium, Total	92.0	91.0	1.2
		Manganese, Total	104.9	100.8*	4.0
		Lead, Total	91.9	92.4	0.46
		Selenium, Total	87.4	87.4	0.061
		Zinc, Total	85.8	93.6	8.8

MW 6/4/01

Lionville Lababoratory, Inc.

INORGANICS ACCURACY REPORT 06/01/01

CLIENT: TNU-HANFORD B01-094 LVL LOT #: 0105L867

WORK ORDER: 11343-606-001-9999-00

SAMPLE	SITE ID	ANALYTE	SPIKED SAMPLE	INITIAL RESULT	SPIKED AMOUNT	%RECOV	DILUTION FACTOR(SPK)
-001	BI2400	Silver, Total	4.4	0.09u	4.7	93.6	1.0
		Silver, Total MSD	4.4	0.09u	4.7	93.6	1.0
		Arsenic, Total	175	4.6	188	90.6	1.0
		Arsenic, Total MSD	174	4.6	188	90.3	1.0
		Barium, Total	246	67.2	188	95.0	1.0
		Barium, Total MSD	242	67.2	188	92.9	1.0
		Cadmium, Total	4.3	0.03u	4.7	91.5	1.0
		Cadmium, Total MSD	4.2	0.03u	4.7	89.4	1.0
		Chromium, Total	26.4	9.1	18.8	92.0	1.0
		Chromium, Total MSD	26.2	9.1	18.8	91.0	1.0
		Manganese, Total	312	263	47.1	104.9*	1.0
		Manganese, Total MSD	310	263	47.1	100.8*	1.0
		Lead, Total	49.0	5.7	47.1	91.9	1.0
		Lead, Total MSD	49.2	5.7	47.1	92.4	1.0
		Selenium, Total	164	0.24u	188	87.4	1.0
		Selenium, Total MSD	164	0.24u	188	87.4	1.0
		Zinc, Total	89.0	48.6	47.1	85.8	1.0
		Zinc, Total MSD	92.7	48.6	47.1	93.6	1.0

Lionville Lababoratory, Inc.

INORGANICS METHOD BLANK DATA SUMMARY PAGE 06/01/01

CLIENT: TNU-HANFORD B01-094 LVL LOT #: 0105L067
WORK ORDER: 11343-606-001-9999-00

SAMPLE	SITE ID	ANALYTE	RESULT	UNITS	REPORTING LIMIT	DILUTION FACTOR
BLANK1	01L0293-MB1	Silver, Total	0.10 u	MG/KG	0.10	1.0
		Arsenic, Total	0.23 u	MG/KG	0.23	1.0
		Barium, Total	0.03	MG/KG	0.02	1.0
		Cadmium, Total	0.03 u	MG/KG	0.03	1.0
		Chromium, Total	0.09 u	MG/KG	0.09	1.0
		Manganese, Total	0.01	MG/KG	0.01	1.0
		Lead, Total	0.26 u	MG/KG	0.26	1.0
		Selenium, Total	0.26 u	MG/KG	0.26	1.0
		Zinc, Total	0.03	MG/KG	0.03	1.0
BLANK1	01L0297-MB1	Silver, Total	0.10 u	MG/KG	0.10	1.0
		Arsenic, Total	0.23 u	MG/KG	0.23	1.0
		Barium, Total	0.03	MG/KG	0.02	1.0
		Cadmium, Total	0.03 u	MG/KG	0.03	1.0
		Chromium, Total	0.09 u	MG/KG	0.09	1.0
		Manganese, Total	0.02	MG/KG	0.01	1.0
		Lead, Total	0.26 u	MG/KG	0.26	1.0
		Selenium, Total	0.26 u	MG/KG	0.26	1.0
		Zinc, Total	0.33	MG/KG	0.03	1.0

Duncan, Jeanette M

From: Weiss, Richard L
Sent: Wednesday, June 20, 2001 10:38 AM
To: Duncan, Jeanette M
Subject: FW: Review of Validation Packages H1334 and H1367

Revised to include comments from J. Lerch

-----Original Message-----
From: Weiss, Richard L
Sent: Tuesday, June 19, 2001 2:36 PM
To: Duncan, Jeanette M
Subject: Review of Validation Packages H1334 and H1367

Jeaette,

H1334

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Pages 1/ 4 "References"; Issue date for the SAP, Rev 2, is September 2000.

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H1367

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Page 4 "Minor Deficiencies"; Same comment regarding TDL as for comment above (Analytical Detection Levels).

Pages 1/ 5 "References"; Issue date for the SAP, Rev 2, is September 2000.

Pages 11,12,13: The correct TDL for CrVI is 0.5 not 0.1.

rich

Review Comment Record (RCR)

1. Date	2. Review No.
06/20/01	QA01-007
3. Project: 600-23 Verification Sampling	4. Page: Page 1 of 1

5. Document Number(s)/Title(s)	6. Program/Project/ Building Number	7. Reviewer	8. Organization/Group	9. Location/Phone
SDG No. H1367	600-23 Verification Sampling - Soil	Claude Stacey	BHI/QA	H0-16/372-9208

17. Comment Submittal Approval:

Organization Manager (Optional) — Date

10. Agreement with indicated comment disposition(s)

Reviewer/Point of Contact — Date

Author/Originator

11. CLOSED

06/27/01 — Date

Reviewer/Point of Contact

Author/Originator

12. Item	13. Comment(s)/Discrepancy(s) (Provide technical justification for the comment and detailed recommendation of the action required to correct/ resolve the discrepancy/problem indicated.)	14. Hold Point	15. Disposition (Provide justification if NOT accepted.)	16. Status
1	Page 011, 012, and 013, the TDL for Cr^{+6} should be 0.5 not 0.1. This would change the validation flags assigned to the Cr^{+6} data. This would also change the statements on page 04 under "Analytical Detection Limits" and "Minor Deficiencies." Although, the statements on page 04 referred to chromium (total) this should be Cr^{+6}.		Carmen K	
2	Page 011, sample number B12401 the ICP data listed does not coincide with the data reported on the laboratory summary report (page 018).		Carmen K	
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rich

6/24/01

TRANSMISSION RESULT REPORT (JUN 20 '01 10:23AM)

BHI S&D MANAGEMENT 509 372 9487

(AUTO)

THE FOLLOWING FILE(S) ERASED

FILE	FILE TYPE	OPTION	TEL NO.	PAGE	RESULT
018	MEMORY TX		12087238944	03/03	OK

ERRORS

1) HANG UP OR LINE FAIL 2) BUSY 3) NO ANSWER 4) NO FACSIMILE CONNECTION

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Review Comment Record (RCR)

1. Date	2. Review No.
06/20/01	QA01-007
3. Project	4. Page
600-23 Verification Sampling	Page 1 of 1

5. Document Number(s)/Title(s)	6. Program/Project/ Building Number	7. Reviewer	8. Organization/Group	9. Location/Phone
SDG No. H1367	600-23 Verification Sampling - Soil	Claude Stacey	BHI/QA	H0-16/372-9208

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Organization Manager (Optional) _____ Date _____

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rich